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MISCELLANEOUS QUESTIONS.

EDITED BY R. D. CARMICHAEL.

When it was necessary to make ready the manuscript for this issue our readers had not yet had time to reply to our first questions, proposed in the November number. It is believed that some replies to those questions may be inserted in the issue next following this one. In the meantime we have received two other interesting questions. They are printed here; and the attention of our readers is directed to them.

QUESTIONS.

3. In connection with the theory of the conduction of electricity through gases, one is led to the differential equation

$$y \frac{d^2 y}{dx^2} + a \left(\frac{dy}{dx} \right)^2 + b \frac{dy}{dx} + cy + d = 0,$$

where a, b, c, d are constants. For unrestricted values of a, b, c, d the solution of this differential equation presents peculiar difficulties, the series solutions obtained by the customary methods having (apparently) too small a range of convergence to be satisfactory from the point of view of electrical theory. The general solution of this equation is wanted in case it can be found. If no general solution is obtained for unrestricted a, b, c, d , it is desirable to know special values of a, b, c, d or special relations among a, b, c, d which make it possible to find the general solution; and this solution is desired in each case.

We shall be glad to receive an answer to any part of this question in case a complete answer is not found.

4. In analytic geometry classes we teach about six formulas for the straight line and often we drill pupils in their use only with formal exercises. Mr. R. M. MATHEWS, of Riverside, California, proposes a collaboration through the MONTHLY by means of which a set of problems of interest in themselves shall be collected for these drill exercises. Our readers are requested to send to the editor of this department such problems, classified under headings suggesting the formula for which each problem is useful, the headings being as follows: two point form, slope point form, slope intercept form, two intercept form, normal form, general form.

As examples of the sort of problem desired we have the following, suggested by Mr. Mathews:

Two point form.—A linear relation connects degrees centigrade with degrees Fahrenheit. Find this relation if $50^\circ \text{ F.} = 10^\circ \text{ C.}$ and $-4^\circ \text{ F.} = -20^\circ \text{ C.}$

Slope intercept form.—The electrical resistance of annealed copper wire is 9.59 ohms per mil-foot at 0° C. , from which point it increases with the temperature in the proportion of 403 per thousand. Express the resistance in terms of temperature centigrade.

NOTES AND NEWS.

UNDER THE DIRECTION OF FLORIAN CAJORI.

The winter meeting of the Chicago Section of the American Mathematical Society will be held at Chicago on December 26–27, 1913.

The October number of the *Popular Science Monthly* contains an article on the Fourth Dimension, by Professor SAMUEL M. BARTON, of the University of the South.

The firm of Gauthier-Villars is undertaking the publication of the complete works of the late HENRI POINCARÉ, under the direction of the Paris Academy of Sciences and the French Minister of Public Instruction.